APPLICATION PROCEDURE FOR APPROVAL OR INTRINSIC SAFETY EVALUATION OF INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS PER 30 CFR PART 18

U.S. Department of Labor
Mine safety and Health Administration
Approval and Certification Center
Electrical Safety Division
Intrinsic Safety and Instrumentation Branch

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MSHA
Mine Safety and Health Administration

ELECTRICAL SAFETY DIVISION STANDARD APPLICATION PROCEDURE - APPLICATION PROCEDURE FOR APPROVAL OR INTRINSIC SAFETY EVALUATION OF INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS PER 30 CFR PART 18

1.0 PURPOSE

This document specifies the documentation, equipment, and components necessary for the Mine Safety and Health Administration (MSHA) to investigate an application for approval or intrinsic safety evaluation (and extensions thereof) of intrinsically safe apparatus and associated apparatus.

2.0 SCOPE

This standard application procedure (SAP) applies to all applications submitted to the Approval and Certification Center (A&CC) for approval or intrinsic safety evaluation (and extensions thereof) for intrinsically safe apparatus and associated apparatus per Title 30 Code of Federal Regulations (30 CFR) Part 18.

3.0 GENERAL

3.1 The applicant can save considerable time and money if the application includes all the information necessary for MSHA to ascertain compliance with 30 CFR Part 18 and ACRI2001 "Criteria for Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus."

3.1.1 A copy of 30 CFR can be purchased from:

Superintendent of Documents
Attn: New Orders
P.O. Box 371954
Pittsburgh, PA 15250-7954
Telephone No. (202) 512-1800

3.1.2 A copy of ACRI2001 can be obtained from:

Mine Safety and Health Administration
Approval and Certification Center
Attn: Records Control Office
RR#1, Box 251
Industrial Park Road
Triadelphia, WV 26059
Telephone: (304) 547-0400
Fax: (304) 547-2044

3.2 Each applicant is encouraged to contact the chief of the Intrinsic Safety and Instrumentation Branch at (304) 547-2026 if there are any questions concerning this procedure. Technical consultations are available by appointment.

4.0 APPLICATION REQUIREMENTS

Each application must include the following:

4.1 Application letter. See Enclosures A-1 and A-2 for useable and completed samples. The application letter must be signed by the person responsible for questions regarding the application. The Company Assigned Application Code Number is a six digit or less number assigned by the applicant. This number should not have been used by the applicant to identify a previous application.

4.2 Drawing list. See Enclosure B for a completed sample. This list should be a complete list of the drawings, bills of material, specifications, certified components, intrinsically safe components, etc. that are submitted, referenced, or used to construct the equipment.

4.3 Checklist. See Enclosure C for a useable checklist. The checklist is a list of the basic information needed to evaluate the application. All applicable items on the checklist(s) must be documented by drawings and specifications. All requirements of 30 CFR pertaining to each circuit may not be included on the checklist and additional information may be required.

4.4 All new and revised drawings, bills of material, and specifications. Each drawing shall be titled, numbered, and dated, in English, and show the sheet number and latest revision. The drawings shall be adequate in number and detail to identify fully the complete assembly, component parts, and subassemblies. The minimum documentation includes:

4.4.1 An overall assembly drawing showing the physical construction of the apparatus and identifying the major components.

4.4.2 Schematic diagrams of each electrical circuit.

4.4.3 Electrical parts lists that include specifications for the following components:

Batteries: Type, voltage, capacity, and manufacturer's name and part number.

Transformers: Manufacturer's name and part number, inductance (nominal and tolerance or maximum value) and dc resistance (nominal and tolerance or minimum value), or; specifications showing the physical construction of the transformer to include: core type, insulation rating, size of wire, number of turns, physical dimensions and spacing (clearances) of terminals and maximum temperature rating of insulation. For protective and power transformers, transformer type (see ACRI2001, Section 7.2), voltage and current ratings of each winding, high potential or dielectric strength specifications between windings, physical dimensions and spacing (clearances) of terminals and maximum temperature rating of insulation are required.

Inductors: Manufacturer's name and part number; inductance (nominal and tolerance, or maximum value), dc coil resistance (nominal and tolerance, or minimum value) and; specifications of the core type, size of wire, insulation, and number of turns.

Mechanical relays: Manufacturer's name and part number, coil inductance (nominal and tolerance, or maximum value), coil resistance (nominal and tolerance, or minimum value), and physical separation (clearances) between coil terminals and switching contacts or contact leads.

Capacitors: Type, capacitance (nominal and tolerance, or maximum value), and working voltage. If the capacitors are used as protective components to provide intrinsic safety isolation, the maximum dielectric voltage must be specified.

Current Limiting Resistors: Resistance (nominal and tolerance), type of construction (single layer wirewound, metal oxide film or metal film), wattage, manufacturer, and manufacturer's part number.

Optical Isolators and Solid State Relays: Manufacturer's name and part number, maximum voltage and current ratings, dielectric strength, and internal and external spacings (clearances) between input and output.

Motors: Manufacturer's name and part number, and; inductance (nominal and tolerance, or maximum value), dc resistance (nominal and tolerance, or minimum value).

Zener Diodes: Zener voltage (nominal and tolerance, or maximum value), wattage, and JEDEC number, or manufacturer and manufacturer’s part number.

Incandescent Lamps and Fluorescent Lamps: Manufacturer, manufacturer's type number, voltage, current and wattage rating.

Solid State Voltage and Current Limiting Devices: Manufacturer's name and part number, input and output voltage (nominal and maximum) and current rating, and power dissipation

rating.

Heat Sinks: Manufacturer's name and part number or details of the physical dimensions and materials used.

Piezoelectric Transducers and Devices: Manufacturer's name and part number and crystal capacitance.

Fuses and other thermal protection devices: Manufacturer's name and part number, current trip rating, maximum interrupt current, voltage rating and time vs. current characteristic curves.

Resistors: Resistance value (nominal and tolerance or minimum value) and wattage rating.

Other Components: JEDEC number, generic number of integrated circuits, power rating, electrical values with tolerances, etc., whichever are applicable.

4.4.4 Layout drawings showing the physical location of parts on printed circuit boards.

4.4.5 Printed circuit board artwork drawings, drawn to scale.

4.4.6 A block diagram showing the major components of the circuit.

4.4.7 A technical description of circuit operation.

4.4.8 A complete operator's manual on the use and maintenance of the unit.

4.4.9 To assist in simplifying the submitted documentation and future modifications, the following are recommended:

Identify components that have no affect on intrinsic safety or required performance by a generic description rather than the specific

manufacturer and manufacturer's part number.

Submit schematics without component values, accompanied by a parts list specifying the ranges of values for each non-critical component.

If the application includes changes to drawings previously filed with MSHA, it will simplify the review process if all changes to the revised drawings are clearly identified. Duplicate drawings with explanatory notations should be submitted for this purpose in addition to a "clean" copy to be placed on file.

4.5 Where parts of circuits being evaluated for intrinsic safety are housed in explosion-proof enclosures that are supplied with the circuits, the enclosure must be identified by manufacturer's name and part number, and MSHA certification or extension of certification number. If the explosion-proof enclosures are to be supplied by the user, detailed installation instructions must be provided.

4.6 Equipment required for inspection and test will be requested by MSHA, in writing. In general, the equipment will include at least:

4.6.1 One complete instrument or device.

4.6.2 Three of each type inductive component rated over 100 microhenries (e.g., motors, relays, speakers, transformers, inductors, etc.).

4.6.3 Three sets of each type battery or battery assembly.

4.6.4 Ten samples of each type current limiting resistor.

4.6.5 Thirty samples of each type incandescent or fluorescent lamp.

4.6.6 Five samples of each type piezoelectric transducer device.

4.6.7 Ten samples of each type protective fuse or other thermal protection device.

4.6.8 Ten samples of each type protective optical isolator.

If any of these components are normally potted or encapsulated, please submit both encapsulated and unencapsulated units. Encapsulated units are required if a dielectric strength test is needed to determine the sufficiency of the encapsulating material and for photographs for the final records.

NOTE: TO ENSURE RETURN OF ANY EQUIPMENT SUBMITTED FOR INSPECTION AND/OR TESTS, A REQUEST MUST BE SUBMITTED, IN WRITING, WITH THE APPLICATION.

4.7 The following information should also be supplied (if available) to aid in the evaluation:

4.7.1 Copies of test reports of other approval agencies.

4.7.2 Photographs of the instrument.

4.8 A Factory Inspection Form in accordance with 30 CFR, Part 18 or a certified statement (see Enclosure D) in lieu of the Factory Inspection Form.

4.9 A computer diskette containing your application letter and drawing list may be submitted with your application. The A&CC uses both WordPerfect and Microsoft Word documents in IBM format.

5.0 PROCESSING PROCEDURES

5.1 After the A&CC receives your application, the ISIB will review your application to estimate the maximum fee to investigate and process your application. This maximum fee is based on the time expended by MSHA to process previous applications of products similar to the type of product described in your application. The fee charged to you will be the actual costs charged by MSHA to process your application per 30 CFR Part 5. It is

anticipated that, in most cases, the action will be fully processed at a cost below the cap. If the fee for processing is less than the cap, the lesser amount will be charged.

The estimate does not include additional time that may be necessary to process your application if the product fails testing or is found not to comply with applicable MSHA requirements. The costs for travel and transportation for the purpose of evaluating or testing your product at the manufacturing or installation site, if required, are also not included in this estimate. The fee charged for this activity will be the actual cost for the travel and transportation. For most applications assigned to the ISIB, it has not been necessary for the investigator to travel to the manufacturing or installation site. Products evaluated by ISIB can usually be tested and inspected at the A&CC.

5.2 The Chief of the ISIB will notify you by letter via certified mail (via air mail for applicants outside the United States) of the maximum fee cap estimated for your application and a tentative date when an ISIB Investigator will start the technical review of your application. A form will be attached to this letter requesting that you either authorize the estimated cost or request to cancel the application. This form is to be completed and returned to the Chief, ISIB, within thirty (30) days of the date of the letter. If the form is not returned, your application will be canceled.

5.3 The ISIB investigator assigned to evaluate your application will review your application and contact you, or the person designated by you in your application letter, to discuss your application. Applicants, or persons designated by the applicant, who are located within the United States or Canada will be contacted by telephone. The investigator will inform you of the specific equipment and components that will be necessary for test or evaluation and of any additional information or documentation that is necessary to continue processing the application. You will receive a discrepancy letter (via air mail for applicants outside the United States) specifying these items.

5.4 You are to provide the equipment and components for test (including special tools, if necessary, to disassemble the equipment) and the appropriate documentation requested in the discrepancy letter. You should contact the ISIB Investigator if you have any questions or if you need additional information to clarify the discrepancy letter. If you cannot respond to each of the items listed in the discrepancy letter within the time frames specified, you may request additional time to respond to those outstanding items. Your response to the discrepancy letter or a request for extension of time to respond to the letter should be in writing and should include the assigned A&CC PAR number referenced at the top of the discrepancy letter. Any request for an extension of time should specify a date to which you wish the deadline to be extended. You are responsible for all shipping arrangements and costs for submitting equipment and components to MSHA for test. **YOU MUST RESPOND TO THIS LETTER WITHIN THE TIME FRAMES SPECIFIED IN THE LETTER OR YOUR APPLICATION MAY BE CANCELED.**

5.5 After receiving your response to the discrepancy letter, the ISIB investigator will schedule the inspection, evaluation, and testing of the equipment.

5.6 You will be notified of all test failures and of all discrepancies resulting from the inspection and evaluation of the equipment. You will receive a discrepancy letter (via air mail for applicants outside the United States) detailing all test failures, discrepancies between the equipment submitted for inspection and the drawings submitted with the application, and equipment and documentation not complying with the applicable MSHA requirements. Additional discrepancy letters will be sent to you, as necessary, to document outstanding discrepancies in your application.

5.7 MSHA will monitor the accrued fees charged to process your application to determine if the fee estimate cap should be revised. Should problems be encountered that would cause the fee to exceed the cap, you will be contacted for authority to pursue the action further (at additional cost), schedule a consultation meeting for which a fee will be charged on an hourly basis, or cancel

the action. Before further action can be taken on the application, authorization to continue based on the revised estimated fee cap must be received by the Approval and Certification Center. If the authorization form has not been received at the A&CC within 30 days from the date of the revised fee letter, your application will be canceled. **IF YOU CANCEL THE APPLICATION, YOU WILL BE CHARGED FOR THE TIME EXPENDED BY MSHA TO PROCESS YOUR APPLICATION.**

5.8 After there are no outstanding discrepancies and the product meets all of the applicable requirements, MSHA will issue the approval, extension of approval, intrinsic safety evaluation, or extension of intrinsic safety evaluation letter for your product. This letter will be accompanied by a list of drawings that document the product as approved by MSHA, a design for the approval marking (if applicable), and will list any conditions of use that are necessary to install and maintain the product in permissible condition. If there are no conditions of use, you will be notified of the issuance of an approval, extension of approval, intrinsic safety evaluation, or extension of intrinsic safety evaluation for your product via an advanced notification letter. You will receive an invoice for the cost of the investigation at a later date.

5.9 Before you make changes in the design of any product bearing an MSHA approval marking or any product evaluated for intrinsic safety by MSHA, you are required to notify MSHA and receive permission to make the changes. MSHA A&CC has several programs you may use to document changes to your product that do not affect the intrinsic safety or required performance of the product. These programs include the Stamped Revision Acceptance (SRA) Program and the Stamped Notification Acceptance Program (SNAP). Contact the ISIB Chief at 304-547-2026 for the latest information on these programs. Changes to your product that would affect the electrical safety or required performance of your product will require an application for extension of approval or intrinsic safety evaluation.

6.0 REVIEW

This document will be reviewed within three years from the issue date.

7.0 RESPONSIBILITY

The applicant is responsible for submitting a complete application package and providing MSHA with all information necessary to process the application.

8.0 DISTRIBUTION

All manufacturers of intrinsically safe equipment.

9.0 AUTHORITY

30 CFR Part 18.

New Approval or Intrinsic Safety Evaluation Application Letter

Applicant name and address:

Chief, Approval and Certification Center
RR#1 Box 251
Industrial Park Road
Triadelphia, West Virginia 26059

DATE: _____

SUBJECT: (choose one) ___ New approval -OR- ___ Intrinsic safety evaluation of the

_____
MODEL TYPE OF EQUIPMENT

Company Assigned Application Code Number: __ __ __ __ __ __ (six digits or less)

Gentlemen:

We request MSHA approval or intrinsic safety evaluation of the subject equipment which consists of the following major components (attach additional sheets as necessary):

Brief description of equipment and its use in mines (attach additional sheets if necessary):

This equipment is similar to the following equipment approved by MSHA (If applicable):

_____

MODEL TYPE OF EQUIPMENT

Approval No. _____, Investigation No. _____ as granted by letter to _____ dated _____.

Enclosed are all the drawings, a drawing list, and a checklist for this application.

If you have any questions, contact: _____
address: _____
_____
telephone: _____ FAX: _____
E-mail address: _____

____ I wish to have all equipment submitted for inspection and/or tests returned upon completion of the investigation.

Sincerely,

Name: _____

Title: _____

(signature)

Extension of Approval or Intrinsic Safety Evaluation Application Letter

Applicant name and address:

_____

_____

_____

_____

Chief, Approval and Certification Center
RR#1 Box 251
Industrial Park Road
Triadelphia, West Virginia 26059

DATE: _____

SUBJECT: (choose one)

___ Extension of Approval No. 2G- _____
-OR-
___ Extension of Intrinsic Safety Evaluation No. IA- _____

Company Assigned Application Code Number: __ __ __ __ __ __ (six digits or less)

Gentlemen:

We request an extension of MSHA approval or intrinsic safety evaluation to include the following changes made in the design of the

_____
MODEL TYPE OF EQUIPMENT

MSHA Investigation No. IA- _____ as granted in a letter to

_____ dated _____:

(List all changes. Attach additional sheets as necessary)

List all major components and provide a brief description of the equipment and its use in mines (attach additional sheets as necessary):

List all model(s) of this equipment to be covered by this extension (attach additional sheets as necessary):

___ This extension does not change the model number or manufacturer's designation for this equipment.
-OR-
___ This extension adds or changes the model number(s) or manufacturer's designation for this equipment.

Enclosed are all the new and revised drawings, a complete drawing list, and a checklist for this application.

If you have any questions, contact: _____

address: _____

_____

telephone: _____ FAX: _____

E-mail address: _____

____ I wish to have all equipment submitted for inspection and/or tests returned upon completion of the investigation.

Sincerely,

Name: _____

Title: _____

DRAWING LIST FORMAT

(signature)

INVESTIGATION NO. IA-(leave blank for new approvals or evaluations)

DRAWING LIST

ABC Company
Model 100 Valve Control Circuit

TITLE	DRAWING	REV.	MSHA FILE STATUS
Model 100 Assembly	A-100	-	New
Model 100 Parts List	PL-101	D	Rev.C, IA-7777-0
PS 12V Assembly	A-113	-	On file, IA-7777-0
PS 12V Schematic	B-114	B	On file, SRA 88888
T-1 Transformer Specification*	TR3456.7	5	New
PS PC Board Artwork	C-102	C	On file, SNAP 99999
Parts List - PS 12V	PL-114	A	On file, SNAP 99999
SOL Solenoid Assembly	A-123	G	New
SOL Specifications	S-124	F	New
Warning Label - SOL	L-123	-	New

Factory Inspection Form: See certified statement from Akmir Abdullah dated October 15, 1998.

ABC Company, P/N 89277, 6 VDC, Power Supply: Intrinsically safe under Investigation No. IA-100.

ABC Company, P/N 89278, Power Supply Enclosure: Certification No. X/P-1000-2.

* Ace Transformer Company Drawing

NOTE: If available, please submit this drawing list on computer disk. MSHA A&CC uses both WordPerfect© and Word for Windows© word processing software in IBM© format. Text from other wordprocessors can likely be converted into a usable format by MSHA.

ENCLOSURE B

INSTRUMENT APPROVAL, EXTENSION OF APPROVAL, INTRINSIC SAFETY EVALUATION, OR EXTENSION OF INTRINSIC SAFETY EVALUATION

Complete the following; leave no blanks. If a particular item does not apply, use the designation N/A.

Administrative

_____ 1. Is the appropriate application form properly completed?

_____ 2. Is a drawing list in the proper format included in the application package?

_____ 3. Are a complete factory inspection form (if not previously accepted), or a certified statement in lieu of a factory inspection form, and caution statement specified and included in the application package? (Sec. 18.6 (j&k))

_____ 4. Are the placement and method of attachment of the approval marking specified? (Sec. 18.11 (b))

_____ 5. Are all correspondence, specifications, and lettering on drawings in English? (Sec. 18.6 (1))

_____ 6. Are all drawings and Bills of Material titled, numbered, dated, and legible? (Sec. 18.6 (e))

_____ 7. Are there any pencil or ink notations on the drawings and Bills of Material? (Note: Pencil and ink notations are unacceptable.)

_____ 8. Do all documents include a note "Do not change without approval of MSHA" on each page or sheet? (Sec. 18.6 (e))

_____ 9. Do all revised drawings and Bills of Material show the latest revision and/or date? (Sec. 18.6 (e))

_____ 10. Do all wiring diagrams showing intrinsically safe circuits include a warning statement that any change(s) in the intrinsically safe circuitry or components may result in an unsafe condition? (Sec. 18.6(e))

Investigative

_____ 1. Does the overall assembly drawing show the location of each major component?

_____ 2. Are schematic drawings of each electrical circuit

included?

_____ 3. Is each battery identified by: Type, voltage, capacity, and manufacturer's name and part number?

_____ 4. Is each transformer identified by: Manufacturer's name and part number, inductance (nominal and tolerance) and dc resistance (nominal and tolerance), or; specifications showing the physical construction of the transformer to include: core type, insulation rating, size of wire, number of turns, physical dimensions and spacing (clearances) of terminals, and maximum temperature rating of insulation?

_____ 5. Are transformer type, voltage and current rating of each winding, high potential or dielectric strength specifications between windings, physical dimensions and spacing (clearances) of terminals and maximum temperature rating of insulation listed for each protective and power transformer?

_____ 6. Is each inductor identified by: Manufacturer's name and part number, inductance (nominal and tolerance, or maximum value) and dc coil resistance (nominal and tolerance, or minimum value) and; specifications of the core type, size of wire, insulation, and number of turns?

_____ 7. Is each mechanical relay identified by: Manufacturer's name and part number, coil inductance (nominal and tolerance, or maximum value), coil resistance (nominal and tolerance, or minimum value), and physical separation (clearances) between coil terminals and switching contacts or contact leads?

_____ 8. Is each capacitor identified by: Type, capacitance (nominal and tolerance, or maximum value), and working voltage?

_____ 9. Is the dielectric voltage specified for capacitors used as protective components to provide intrinsic safety isolation?

_____ 10. Is each protective current limiting resistor identified by: Resistance (nominal and tolerance), type of construction (single layer wirewound, metal oxide film or metal film), wattage, manufacturer, and manufacturer's part number?

_____ 11. Is each optical isolator and solid state relay identified by: Manufacturer's name and part number and, maximum

voltage and current ratings, dielectric strength, and internal and external spacings (clearances) between input and output?

_____ 12. Is each instrument motor identified by: Manufacturer's name and part number, and inductance (nominal and tolerance, or maximum value) and dc resistance (nominal and tolerance, or minimum value)?

_____ 13. Is each zener diode identified by: Zener voltage (nominal and tolerance, or maximum value), wattage, and JEDEC number, or manufacturer and manufacturer's part number?

_____ 14. Is each incandescent and fluorescent lamp identified by: Manufacturer, manufacturer's type number, voltage, current and wattage rating?

_____ 15. Is each solid state voltage and current limiting device identified by: Manufacturer's name and part number, input and output voltage (nominal and maximum), current ratings and power dissipation rating?

_____ 16. Is each heat sink identified by: Manufacturer's name and part number or details of the physical dimensions and materials used?

_____ 17. Is each piezoelectric transducer **or** device identified by: Manufacturer's name and part number, and crystal capacitance?

_____ 18. Is each fuse or other thermal protection device identified by: Manufacturer's name and part number, current trip rating, maximum interrupt current, voltage rating and time vs. current characteristic curves?

_____ 19. Are all other non-energy storage components identified by JEDEC number, generic number of integrated circuit, power rating, electrical values with tolerances, etc., whatever is applicable?

_____ 20. Do the p.c. board layout drawings show the physical location of each electrical component?

_____ 21. Are all p.c. board artwork drawings included with scaling dimensions indicated?

_____ 22. Is a block diagram included?

_____ 23. Is a technical description of the circuit operation

included?

_____ 24. Is a complete operator's manual on the use and maintenance of the unit included?

_____ 25. Do the schematic diagrams clearly show which circuits must be located in fresh air or housed in an MSHA certified explosion-proof enclosure?

_____ 26. Where parts of circuits being evaluated for intrinsic safety are housed in explosion-proof enclosures that are supplied with the circuits, is the enclosure identified by manufacturer's name and part number, and MSHA certification or extension of certification number?

_____ 27. If an explosion-proof enclosure is to be supplied by the user, are detailed installation instructions provided?

_____
(Signature)

_____ _____
(Title) (Date)

SAMPLE CERTIFIED STATEMENT

Company: _____ Date: _____

Address: _____

_____

_____

SUBJECT: _____
(Model/Type Number and Type of Equipment)

Company Assigned Application Code No.: _____

I, _____, certify that the
(Name and Title)
_____ will conduct regular
(Company or Corporation)
inspections of all MSHA approved or evaluated devices manufactured by this company/corporation to ensure that these products are made and assembled in strict accordance with the drawings and specifications approved by MSHA.

Sincerely,

(Name and Title)

ENCLOSURE D